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ITEM-SPECIFIC AND INTERITEM ELABORATION IN RECALL AND RECOGNITION

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This experiment explored the role of different types of elaboration in recall and recognition. Recall benefitted most from interitem elaboration, whereas recognition benefitted most from item-specific elaboration. Moreover, intentional learning instructions increased recall, but had no effect on recognition. These results suggest that recall requires more extensive elaboration than recognition. This information will be of use in creating elaborative learning strategies which produce the highest performance for a

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particular type of retention. For example, when recall of a connected body of information is required, as in tactical battlefield conditions, performance should be enhanced by using learning strategies that emphasize relationships among the various pieces of this information. On the other hand, when recognition of a specific piece of information is needed, as when consulting a reference manual for vehicle maintenance, performance should be facilitated by using techniques which encourage relating this information to previously learned information.

ITEM-SPECIFIC AND INTERITEM ELABORATION IN RECALL AND RECOGNITION

EXECUTIVE SUMMARY

Requirement:

To explore differences in recall and recognition performance following various types of elaborative processing for study list items.

Procedure:

Recall and recognition scores were obtained following either no elaboration, item-specific elaboration or interitem elaboration of study list words. An orienting task involving scanning a list word for the presence of either the letter O or the letter A was used to induce minimal elaboration. Item-specific elaboration was induced by an orienting task involving a decision about whether an item was pleasant or unpleasant. Interitem elaboration was induced by a task requiring a decision about whether a current list word was associatively related to any previously presented list word or words.

Findings:

The results of this experiment indicated that both recall and recognition were best following elaborative processing. However, recall performance was highest following interitem elaboration, whereas recognition performance was highest following item-specific elaboration.

Utilization of Findings:

These findings demonstrate that different types of elaboration may be optimal for different tests of memory. This information will be of use in creating elaborative learning strategies which produce the highest performance for a particular type of retention. For example, when recall of a connected body of information is required, as in tactical battlefield conditions, performance should be enhanced by learning strategies that emphasize relationships among the various pieces of this information. On the other hand, when recognition of a specific piece of information is needed, as when consulting a reference manual for vehicle maintenance, performance should be facilitated by strategies that encourage relating this information to previously learned information.

Item-specific and Interitem Elaboration

in Recall and Recognition

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Abstract

This experiment explored the role of different types of elaboration in recall and recognition. Recall benefitted most from interitem elaboration, whereas recognition benefitted most from item-specific elaboration. Moreover, intentional learning instructions increased recall, but had no effect on recognition. These results suggest that recall requires more extensive elaboration than recognition.

Current memory research suggests that different types of encoded information may be used during recall and recognition. Mandler (1979; 1980) has proposed that recognition may rely on item familiarity or on elaboration, whereas recall is primarily dependent on elaboration. Familiarity is a product of integration of item features and is affected by increased exposure to the item. Elaboration, on the other hand, involves the deliberate formation of relations among items. Elaborative processing may not always be required for recognition, especially when familiarity information is available. In contrast, recall is highly dependent on this type of processing. The purpose of this experiment was to further investigate the role of elaborative processes in recall and recognition.

According to Mandler (1980), elaboration involves both the formation of relationships between study list items and the formation of relationships between a single list item and associated items in memory. From this standpoint, elaboration encompasses encoding operations involved in interitem organization, as well as those involved in item-specific semantic processing. Recently, however, Hunt and Einstein (1981) have distinquished between these two types of encoding processes. They suggest that interitem elaboration or organization produces relational information about features shared by individual items, whereas item-specific elaboration or semantic processing produces information about the features that are unique to each item. This distinction between these two types of elaborative processing parallels the conceptual distinction between the traditional organizational approach to memory and the more recent levels of processing approach.

The organizational approach holds that relational information is critical for successful retrieval. Categorized or associatively related word lists are often used to promote encoding of this type of information because their inherent sructure emphasizes the overlapping or common features of target items. The levels of processing approach suggests that retrieval is facilitated by semantic elaboration. Elaborative processing is typically induced by orienting tasks that involve extensive processing of the semantic features of individual target items. For example, these tasks may require that an item be rated for pleasantness or fit into a sentence frame.

Elaboration of an item produces a more distinctive memory trace. Distinctiveness is a function of the number of target item features which do not overlap with those of other to-be-remembered items (Jacoby, Craik & Begg, 1979). Elaborative processing, therefore differs from interitem processing in that it focuses on unique or distinctive item features rather than shared or common item features. The levels of processing approach does not address possible questions arising from this difference in item-specific and interitem elaboration.

Our experiment examined the differential effectiveness of these two types of elaborative processing in recall and recognition. In accordance with Hunt and Einstein, (1981) we expected that directing attention to shared features of target items would produce a qualitatively different type of information than directing attention to their unique features. We further assumed that these two types of information would serve different purposes at retrieval. Relational information apparently enhances retrieval by allowing effective

target item generation or reconstruction; item-specific information facilitates retrieval by delineating target items from other items stored in memory (Hunt & Einstein, 1981). Although both recall and recognition generally benefit from elaboration (Craik & Tulving, 1975), the type of elaboration which is optimal for recall may differ from that which is optimal for recognition. In recall, elaborative information guides a search for previously presented items and serves a reconstructive function. In recognition, elaborative information respecifies the context in which an item was previously encountered and serves a discriminitive function. We therefore expected that an orienting task encouraging interitem elaboration would benefit recall, whereas an orienting task emphasizing item-specific elaboration would benefit recognition.

We selected three types of orienting tasks. Interitem elaboration was induced by instructions to decide whether a current list item could be meaningfully related to any previously presented list item. Item-specific elaboration was induced by instructions to determine whether a list item had a primarily pleasant or unpleasant meaning. In addition, we included an item-specific physical processing task which involved determining whether a list item contained the letter A or the letter O. This task, which should induce minimal elaboration, served as a baseline against which to assess the general benefit in retrieval from elaborative processing. We expected that both tasks requiring elaboration would produce better recall and recognition than the task involving only physical processing. However, we also expected that interitem elaboration would produce higher recall than item-specific elaboration, whereas item-specific elaboration would produce the best recognition.

In addition to the three orienting tasks, we examined the effect of intentional and incidental learning instructions. It has been shown that intentional and incidental instructions produce similar levels of recognition, whereas intentional instructions produce better recall (Estes & DaPolito, 1967). In accounting for these results, Mandler (1980) has argued that it is not intention to learn per se that increases recall, but the fact that the subject organizes learning materials when given intentional instructions. In line with this position, the index of subjective organization grows more rapidly during intentional learning (Jenkins, 1974). Higher recall under intentional instructions in the present experiment would further support the importance of interitem elaboration for this type of retrieval.

Method

Design and Materials

The combination of variables in this experiment produced a 2x2x3 mixed factorial design with type of learning instructions (intentional vs. incidental) and type of retrieval test (recall vs. recognition) as between-subject factors and type of orienting task (item-specific physical vs. item-specific elaboration vs. interitem elaboration) as a within subject factor. Presentation order for the orienting tasks was counterbalanced within each of the four combinations of learning instructions and retrieval test.

Two lists, a 15 item practice list and a 60 item study list, were created using common words containing either an O or an A, but not both letters. These words were selected from the A and AA categories of the Thorndike-Lorge (1944) word count. The two lists were divided into three blocks of 5 and 20 words, respectively. For each subject, a block of words was associated with only one orienting task; across the subjects in each condition a block was associated equally often with each orienting task.

Procedure

Subjects in all four conditions were instructed in the performance of the three orienting tasks. For the item-specific physical task, they were asked to determine whether a word contained the letter A or the letter O. For the item-specific elaboration task, they were asked to determine whether a word had a pleasant or unpleasant meaning and for the interitem elaboration task, they were asked to determine whether the current list word was related or unrelated to any previously presented list words. Each word was presented for a duration of 500 milliseconds and there was an eight second interval between words. Responses for each orienting task were made by pushing one of two buttons labeled with the approriate decision alternatives. Following the orienting task instructions, subjects in the intentional recall condition were told to expect a recall test for the list items and those in the intentional recognition condition were told to expect a recognition test. Subjects in the two incidental learning conditions were given no information concerning their retrieval test at this time.

All subjects first received the practice list to familiarize them with the orienting task procedures. The presentation of the study list followed the practice list. After the presentation of the study list, the subjects performed a 5-minute distractor task consisting of circling specified digits in a table of random numbers. Those in the intentional and incidental recall conditions were then given 15 minutes to recall the study list words. Those in the intentional and incidental recognition conditions were given an equal amount of time to complete a YES-NO recognition test and confidence rating for the study list items plus an equal number of distractor items chosen from the same word pool.

Subjects

There were 72 subjects, with 18 subjects per condition. Each subject was tested in a single 1 1/2 hour session.

Results

The results of the retrieval tests are illustrated in Table 1. Separate analyses were run on the recall and recognition data. The analysis of recall proportions produced a main effect of learning instructions. Recall performance was better following intentional learning instructions than following incidental learning instructions. The effect of orienting task was also significant and there was no interaction between this factor and learning instructions. Further analyses (Neuman-Keuls) of orienting task means collapsed across instructions showed that the pleasantness decision task and the list association task produced better recall than the letter scan task.

Thus, in agreement with previous research (Craik & Tulving, 1975), recall benefits more from semantic elaboration than from physical processing. However, the analysis also indicated that the list association task led to higher recall than the pleasantness decision task. Apparently elaborative processing which involves establishing associations between list items is more useful in recall than e aborative processing which focuses on the meaning of the individual item.

An analysis of the recognition data revealed that, in contrast to recall, there was no effect of learning instructions. Recognition performance was not affected by knowledge of the later retrieval test. However, there was a substantial effect of orienting task, showing that performance of the three tasks produced different levels of recognition. The absence of an orienting task by learning instructions interaction indicated that this difference was present for both types of instructions. Further analyses (Neuman-Keuls) of orienting task means collapsed across learning instructions demonstrated that both the pleasantness decision task and the list association task produced higher recognition than the letter scan task. However, the pleasantness decision task led to better recognition than the list association task. These results parallel the recall results in showing that recognition is better following elaborative processing than following physical processing. However, in contrast to recall, item-specific elaboration leads to better recognition than interitem elaboration.

Although these analyses demonstrate differential effects of item-specific and interitem elaboration in recall and recognition, we felt that this might be due largely to recall differences in the intentional learning condition. In order to investigate this possibility, we recently conducted a similar experiment using only incidental learning instructions. The means for this experiment were as follows: For recall, the means for the item-specific and interitem elaboration tasks were .36 and .51, respectively; for recognition, these means were .93 and .87, respectively. (FA's were .08 and .09, respectively). These results thus replicate the initial findings and indicate that the observed differences in recall and recognition for the two types of elaboration are not due to the influence of intentional learning instructions.

Discussion

These results call attention to two differences between recall and recognition. First, intentional recall instructions lead to higher recall than incidental instruction, whereas intentional recognition instructions have little effect on recognition. Second, interitem elaboration leads to better recall than item-specific elaboration, whereas item-specific elaboration produces better recognition. Overall, these findings suggest that elaborative processes which produce relational information are necessary for optimal recall, while those which produce item-specific semantic information are necessary for optimal recognition.

Other investigators have made similar suggestions about the differential effectiveness of various types of elaboration in recall and recognition. Jacoby, Craik and Begg (1979) have proposed that recall relies heavily on

reconstructive processes, whereas recognition is dependent on the distinctiveness of the memory trace. Consistent with this notion, they have shown that the presence of strong pre-experimental semantic associations between words enhances recall. However, increasing task difficulty, resulting in a more istinctive encoding for items, plays a larger role in recognition. In a similar vein, Belleza and his collegues (Belleza, Cheesman & Reddy 1977) have demonstrated that organizational strategies, such as the alphabet and story mnemonics, aid recall more than an item-specific task such as word definition. Finally, Griffith (1975) has reported that categorization produces better recall than elaborative visual imagery for indivdual items. The latter task, however leads to better recognition. The present results extend these findings by showing that the formation of associations between list items is important for recall and extensive semantic processing of the individual item is important for recognition.

The distinction between relational and item-specific semantic information may be useful in accounting for the somewhat puzzling finding that recognition performance is often unaffected by organization (Kintsch, 1968; Bruce & Fagan, 1970), but is consistently enhanced by item-specific semantic processing (Craik & Tulving, 1975). Presumably, some item-specific semantic processing occurs prior to or during organization (Belleza, Cheesman & Reddy, 1977). However, focusing on the associations between items may reduce the amount of attention which can be devoted to processing distinctive item features. Thus, interitem elaboration may produce relational information at the expense of item-specific information. Since relational information may not be critical for successful recognition, performance is unaffected by the presence of this information in memory. In contrast, focusing on the distinctive semantic features of items produces extensive item-specific information, but little relational information. This increase in the amount of item-specific information leads to better recognition performance.

In summary, the present results suggest that Mandler's (1979, 1980) view of elaboration, which includes both interrelating several target items and relating a single target item to associated items in memory, is too broad. Interitem elaboration and item-specific elaboration differ both in the type of information they produce and in their effect on recall and recognition. It may therefore be useful to distinguish not only between integrative and elaborative processing, but also between various types of elaborative processing.

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Table 1

TEST	INSTRUCTIONS	ORIENTING TASK LETTER SCAN	 PLEASANTNESS DECISION	 LIST ASSOCIATION
Recall	Incidental	.05	.29	.33
	Intentional	.15	.32	.40
Recognition	Incidental	.42	.95	.85
	Intentional	.51	.95	.84